AMERICAN FARMER.

RURAL ECONOMY, INTERNAL IMPROVEMENTS, PRICE CURRENT.

" *O fortunatos nimium sua si bona norint*
" *Agricolas.*" VIRG

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AGRICULTURE.

Extract from Darwin's Phytologia.

Economy of Vegetation.

THE GROWTH OF SEEDS, BUDS, AND BULBS.

(Concluded.)

III. 1. BULBS. *Leaf-bulbs precede flower-bulbs in the tulip as leaf-bulbs in apple-trees, as joints in the stalk of wheat. Solitary generation of insects. 2. Bulbs of onions. Orchis Tulip. Hyacinth. Ranunculus. Iris. 3. Roots of potatoes. Wires of strawberries.—Seeds of orchis. Flowers of potatoes. 4. Stem bulbs on magical onions are similar to root-bulbs. 5. Root-grafting. Root-inoculation. Root-propagation. Suckers of trees. Root-buds of herbaceous plants. Internal parts of which decay. 6. Tuberous roots of turnip and carrot are reservoirs of nutriment for the succeeding flower-stem. No flower-bud is ever produced from a seed without previous leaf-buds. Why seedling apple-trees are ten or twelve years before they bear fruit. Magazines of aliment in almost all roots. 7. Use of the horse-hoe to accumulate earth round the wheat-plants. Wheat dropped on the soil shoots up but one stem. Covered with the soil it shoots up many. And transplanted deeper in the soil many more. Potatoes, vines, and figs, produce lateral roots from their joints. So does the bark of wounded circularly. Use of eating down forward wheat with sheep.*

III. 1. THE BULBOUS ROOTS of some perennial herbaceous plants, and the root-scions of other perennial herbaceous plants, are similar in this respect, which distinguishes them from buds: that they are generated on the broad caudex of the plant within the ground, or in contact with it, and immediately shoot down their new roots into the earth. Whereas buds are formed above the soil on the long caudexes, which constitute the filaments of the bark of trees, and shoot down new roots into the earth from the lower end of these elongated caudexes.

Bulbs have not improperly been called subterraneous buds; and like them they may be divided into leaf-bulbs and flower-bulbs.—When a tulip-seed is sown, it produces a small plant the first summer, which in the autumn dies, and leaves in its place one or more bulbs. These are leaf-bulbs, which in the ensuing spring rise into stronger plants than those of the first year, but no flowers are yet generated: in the autumn these perish like the former, and leave in their places other leaf-bulbs stronger, or more perfect than their preceding parents. This succession of leaf-bulbs continues for four or five years, till at length the bulb acquires a greater perfection or maturity, necessary for seminal generation, and produces in its place a large flower-bulb in the centre with several small leaf-buds around it.

This successive formation of leaf-bulbs in bulbous rooted plants previous to the formation of a flower-bulb is curiously analogous to the production of leaf-buds, on many trees for several years before the production of flower-buds; thus the apple-trees, pyrus malus, which are raised from seeds, generate only leaf-buds for ten or twelve years, and afterwards annually generate both flower-buds and leaf-buds. From whence it would seem, that the adherent lateral or paternal progeny is the most simple and easiest, and consequently the first mode of reproduction; and that the amatorial or seminal progeny is on this account not generated till the maturer age or more perfect state of the parent-bud.

A still more curious analogy to this circumstance of a succession of leaf-buds and leaf-bulbs preceding the formation of flower-buds and flower-bulbs exists in the growth of wheat, triticum, and other grasses; but with this difference, that a succession of leaf-buds, as of two or three, or four, are produced in the same year previous to the flower-bud. At the first joint of the stem of wheat, on or within the surface of the earth, a leaf is produced; from which rises the principal or central-bud, and around it many new buds, which strike their roots into the soil. After this central bud, and those around it, have arisen six or eight inches, a new leaf and a new leaf-bud rises on each of them, producing a second joint of the stem; and lastly, a flower-bud is generated at the summit, which are all evidently distinct vegetable beings, as there is a division across the stem at each joint, which shews there is no connexion of the pith, or brain, or spinal marrow, between the lower and upper joints, as mentioned in Sect. I. 8.

That a new bud thus constitutes each joint of the stem of wheat, and other grasses, is further evinced; first, by the existence of a leaf at each joint without a lateral bud in its axilla, as occurs in other vegetables. Secondly, because for the nourishment of this new leaf-bud a reservoir of sweet-juice is prepared in the new joint; as in the bulbs of many plants. And thirdly, because the lower leaf dies, and the sweet juice is absorbed, as the upper leaf becomes vegete. Hence we acquire the knowledge of the use of this reservoir of sugar in the vegetable economy, which supplies so much agreeable and salutary nourishment to mankind from the cultivation of the sugar-cane. See No. 1. 6. and No. 3. 7. of this Section.

The analogy between the buds of plants and the adherent lateral progeny of some insects as of the polypus, and tenia, or tape-worm, and volvox, was mentioned in Sect. VII. 1. 4. But the circumstance of the successive production of leaf-buds and leaf-bulbs previous to the production of flower-buds or flower-bulbs is wonderfully analogous to the generation of the aphis, which rising from an egg in the spring after casting its skin once or twice produces a living progeny without amatorial copulation; and this offspring produces others by this solitary propagation till the tenth generation; then a sexual progeny of males and females is produced, and eggs are laid in the autumn from their amatorial intercourse. Encycloped. Britain. Amœnitat. Academ. Vol. VII. by A. T. Bladh. See Sect. XIV. 3. 2. Thus this insect from from the egg requires to be reproduced many times by solitary propagation before it becomes sufficiently perfect to generate a sexual offspring like the buds and bulbs from seeds above mentioned. And it is probable, that the polypus of our stagnant waters, which produces a lateral offspring in the summer, I suppose by solitary propagation, may produce males and females, and generate eggs in consequence in the autumn for their reproduction the ensuing spring.

To this may be added the great change, which many insects and even larger animals undergo either in strength or form, before they acquire the power of seminal reproduction. As the silk-worm changes into a butterfly apparently for the purpose of generation only, as it then performs this office and dies. Other caterpillars change their form likewise into butterflies, and at the same time change their kind of food, which was the green foliage of vegetables before this transformation; but now consists solely of honey. And lastly, the gnat and musqueto change at the same time both their forms, their food, and their element; and thus acquire higher animation apparently for the purpose of sexual reproduction.

2. The manner of the production of herbaceous plants from their various perennial roots wants further investigation as their analogy is not yet clearly ascertained. I this autumn dissected two large roots of the onion or leek kind, which were in full flower; the stem of each of them was embraced by the cylindrical pedicles of six or seven concentric leaves; but the stem itself arose from the centre between three large new bulbs in one of them, and between two in the other. All of which grew from the same caudex, but the central flower-stem was wrapped at its bottom in one membrane only, which separated it from the new bulbs in its vicinity.

A large root of a young onion, which grew from seed sown in the spring, was at the same time dissected by stripping off the leaves, and their fleshy bases, one after another, till two buds were visible in the centre of the fleshy bases of the concentric leaves, which formed the bulb. These two bulbs were evidently formed and nourished on the caudex by the stem, and its six or seven concentric cylindrical leaves; and will, I suppose, separate in the spring, as they rise up, and produce each of

them a flower with two or three new bulbs at the base of it as described in the above paragraph.

Or from the different size and apparent greater maturity of the central bulb, and the secondary bulb, being between the innermost and the second circular fleshy membrane, I suppose in these roots of onion, like the tulip-roots before spoken of, that the central bulb, alone may produce a flower in the next summer; and that the lateral bulb or bulbs will produce only stronger and more mature leaf bulbs, which will in the succeeding summer bear a flower or sexual progeny

The caudex, or central part of the bulb, from which the root-fibres descend, and the leaves ascend, lies above the knot in the orchis morio; and the parent root shrivels up and dies, as the young one increases. The flower of this plant does not ripen its seeds in this climate; it might be otherwise worth cultivation for the use of the new roots; which when scalded and peeled, are said to be the salep of the shops It is asserted by one of the Linnean schools in the Amœn. Academ that if the new root be pinched off, the seeds on the old one will ripen, and become prolific.

In the tulip the caudex lies below the bulb, from whence proceed the fibrous roots and the new bulbs; the root after it has flowered dies like the orchis root; for the stem of the last year's tulip lies on the outside, and not in the centre of new bulb. In the tulip-root, dissected in the early spring just before it begins to shoot, a perfect flower is seen in its centre; and between the first and second coat the large next year's bulb is, I believe, produced; between the second and third coat, and between this and the fourth coat, and perhaps further, other less and less bulbs are visible, all adjoining to the caudex at the bottom of the mother bulb; and which I am told, require as many years, before they will flower, as the number of coats with which they are covered; and that the same different states of maturity probably obtain in the buds round the shoots of many fruit-trees, the central one of which will produce flowers the next year as on the spurs of apple-trees; while those beneath it require more or fewer years, before they become sufficiently mature to produce organs of sexual generation; an important secret in the management of fruit-trees.

The hyacinth-root differs from the tulip-root; for, as I am informed, the stem of the last year's flower is always found in the centre of the root, as in the onions above described; and that the new off sets arise from the caudex below this bulb, and not between any of the concentric coats of it, except the two external ones. On this account the central part is liable by its decay to destroy the flower-bud, if not taken out of the earth, when the leaves die; and hence some florists believe, that these roots perish naturally in five or seven years, after they have flowered, but that the tulip-root never dies from age.

In a few roots of hyacinths, which I this day examined, September 1, the stem of one, which had apparently flowered in the summer, was perfectly decayed in the centre of many new bulbs. In another bulb of less size and compass, which I supposed had not borne a flower, I found central flower-bud inclosed in many concentric fleshy bases of former leaves, like an onion in the autumn, which had been sown in the preceding spring. And concluded from hence, that the hyacinth-root dies annually or biennially like the onion, leaving behind it a successor of leaf-bulbs or of flower bulbs. The caudex and claw-like roots of the ranunculus cultivated by florists dies I believe annually, after having put forth a circle of new claws from the upper part of it round the bottom of the perishing flower-stem. Hence the claws of the old-root, which became shrivelled, as the flower advanced, in the autumn disappear; and the decayed part of the old caudex is seen beneath the new claw-like roots, which I suppose has given occasion to some inaccurate observers to believe, that the old stem in this and some other perennial herbaceous plants was drawn downwards by the new root-fibres; while the bulbs of the iris have been supposed to have been pushed upwards, like the lamb-like barometz, by the resistance of the soil to the elongation of the root fibres; which last seems to be a much more probable idea than the former.

From these observations it appears, that the concentric leaves, which incircle the stems of bulb-rooted plants, are the lungs to the caudex, as one or more leaves are to the bud of a tree; and that the caudex with these leaves, and the root-fibres, constitute a vegetable being; which produces a viviparous progeny of new leaf-bulbs, or a seminiferous progeny in flower-bulbs, with a magazine of nutriment in the fleshy base of each leaf; and that the tulip produces only leaf-bulbs for four or five years from the seed, and then but one flower-bulb with many leaf-bulbs annually. But that the onion kind, allium, generates two or three flower-bulbs in the first summer from the seed; which produce flowers and other leaf-bulbs in the second summer from the seed. And lastly, that it is probable, that all bulbous roots, like the buds of deciduous trees, and perhaps of evergreen ones also, are properly speaking biennial plants, as they rise in one summer and perish in the next.

3. In tulip-roots, which have been planted too deep in the earth, and in onion-roots, a vegetable cord, or process, is sometimes seen about an inch long to arise from the caudex beneath the bases of the cylindrical leaves, and to form a new bulb. Similar to this appears the natural growth of the roots of potatoes; a spermatic cord arises from the old root, after the leaves are expanded in the air, to oxygenate the vegetable blood, and a new tuberous or bulbous root is thus generated.

This mode of producing distant roots is exactly resembled above ground by the wires of strawberries; which may be called spermatic cords, which deposit a new vegetable being on the earth, and support it like a bud on a tree, till it can strike roots into the soil, and elevate leaves into the air. The final cause of the length of these subterraneous and ærial spermatic cords is evidently the design of placing their roots at a convenient distance from their parent plants; that they may not incommode each other, but may both of them more readily acquire nutritious juices from the earth, and the ventilation and sunshine of the atmosphere.

These embryon vegetables in the various bulbous and tuberous roots are in very different states of maturity, as in the buds of different trees; thus in the potato the corculum or plumula of the new plant only is visible, surrounded with a farinaceous nutriment, as in many seeds; whereas in the tulip and hyacinth the flower of the succeeding year is discernible, as in the bud of the horse-chesnut.

As the ripening of the seed of some bulbous-rooted plants is forwarded by destroying the new bulbs, as in orchis; and the flowering bulbs of other plants are made stronger by raising them out of the earth, and taking away the leaf-bulbs, which surrounded them on the same caudex; as in the customary management of tulip-roots, and hyacinth-roots by the florists; I was led to suspect, that pinching off the flowers of potatoes two or three times might increase the size or quantity of the roots; as the nourishment derived from the vegetable blood to the flowers and seeds might thus be directed to enlarge the roots, and thus lay up more nutriment for the future plants. This idea I mentioned to an ingenious lady, who acquainted me a few months afterwards, that on a few roots she had made this experiment with apparent advantage.

4. The bulbous and tuberous roots of plants are a lateral or paternal progeny like the buds of trees, and therefore exactly resemble the parent plant, as mentioned in Sect. III. 2. 1. and on this account may be liable to be effected by hereditary diseases, and thus to become unhealthy; whence the canker is supposed to arise in those apple-trees, which have for a century or two been propagated by grafting; and the curled leaf in potatoes, which have been too long propagated by their bulbs; and the barrenness of hautbois strawberries, which have too long been propagated by wires; all which diseases are believed not to happen in these plants, if they have recently been raised from seed, but want further observations to authenticate the facts.

But there exists a set of bulbs, which seem to be formed by amatorial or seminal generation, and not by the lateral or paternal generation, and would therefore seem to be a viviparous sexual progeny These are produced on the flower-stem in the place of seeds; and in process of time fall off, and take root in the earth, as is agreeably seen in the polygonum viviparum, viviparous bistort, and the magical onion, allium magicum, and the leeke, allium sativum. A curious question here occurs, whether the plants from these bulbs are liable exactly to resemble their parents? and whether they would be liable to hereditary diseases from a long cultivation of them in succession, as is supposed to happen to those mentioned above?

Though a perfect flower precedes the product of some summit-bulbs, as I believe in the lower part of the spike of the polygonum viviparum; yet I suspect, that the summit-bulbs of allium magicum, are exactly similar to the bulbs, which are produced at their roots; because on cutting one of them horizontally into two hemispheres this morning, September 10, I observed three young bulbs inclosed in the concentric fleshy membranes of the summit-bulb

in the following manner; five thick fleshy concentric coats of the general summit-bulb being taken away, there appeared one single naked small bulb; and the sixth coat being removed, two other bulbs became visible, which were included in it. Whence it seems, that these stem-bulbs are as forward as those of the root, and probably are in every respect similar; and that the bractes or floral-leaves, which in seed bearing plants secrete or prepare a nourishment for the seed, and pericarp of the flower, acquire in these bulbiferous onions and leeks a new office and prepare a magazine of nourishment in the concentric membranes, which surround their summit-bulbs; and these may be esteemed therefore a sexual viviparous progeny of vegetables, as buds are a lateral viviparous progeny.

5. The roots of trees so resemble their branches, that subterraneous buds are frequently produced upon them, which resemble the parent-tree. The bark of the root likewise so resembles the bark of the branches, that it is not uncommon to ingraft with success on roots taken out of the earth and replanted; as the robinia on the root of the acacia. & any other apples on the roots or the suckers of bur-apples or of codlings; which may be done earlier in the vernal months, as being less liable to injury from frosty nights; and it is probable, that budding or inoculating may be performed in the same manner on the roots at midsummer, as on the branches.

The roots of those plants, which are otherwise not easily propagated, will shoot up buds, if a part of them next to the plant be half cut through, or raised out of the ground, and exposed to the air; as in pyramidal campanula and geranium lobatum; and after a time the root may be separated from the stock, and many new plants may be this way produced.

These root-buds, or suckers, are generally produced near the trunk of the tree, before the root descends much beneath the soil; but in some trees, as the elm ulmus, and acer, maple, whose roots spread far horizontally, and near the surface of the earth, they are generated at a great distance from the parent tree; because the new scion can thus soon acquire the influence of the atmosphere on its expanding foliage. These root-scions from apple-trees are frequently used in vegetable nurseries for the purpose of ingrafting upon, and are termed paradise stocks by some gardeners; but are not liable to the canker like the grafts from those old apple-trees, which have been in fashion above a century; as these root-scions resemble the trunk of the tree, which produces them, not the ingrafted head of it; and thus may not have been many years from the state of a seedling vegetable.

Similar to these root-scions of trees it is probable, that the root-buds of perennial herbaceous plants are produced; which have divaricated, or fibrous-roots, and whose summits perish in the winter. For many years the root thickens by an annual new bark being induced over the old one, exactly as in the trunks and roots of trees.

As these roots increase in size, the central part, I suppose, changes like the internal wood of a tree, and ceases to possess vegetable life; and in process of time is liable to decay. On this account these perennial roots are not so valuable for the purposes of medicine or diet, or mechanic arts, either before or after they have passed a determinate age; as the bark of the root changes annually into a kind of alburnum, and then into a kind of wood, and lastly, is liable to decay, as occurs in the roots of rheum palmatum, when they are seven or more years old. See Sect. XVII. 2 1 This decay of the central part of the root, which happens annually to some plants, and is surrounded with new budsand their root-fibres, exhibits the appearance of the lower end of the root having been chopped, or bitten off, to some fanciful botanists; as in plantago major, and valerian: and has hence given to scabiosa succisa the name of devil's-bit, morsus diaboli.

6. The bulbs already mentioned, as those of tulips, hyacinths, and onions, are properly the winter-cradles, or hybernacula, of the young plants, whether in their leaf bulb or flower bulb state; and are furnished with a magazine or reservoir of nourishment for the growing embryons, as appears in the squil, scilla maritima, which vegetates from this source of nutriment in the druggists shops. But there are other roots termed tuberous roots, as of turnip and carrot, which consist solely of a large reservoir of nutriment for the growth and nourishment of the rising stem and future seeds; whether these are produced in the same year, as occurs, when the seeds are sown early in the spring; or when their vegetation is stopped by the cold of winter, and proceeds again in the ensuing spring; as generally occurs to our turnips, the roots of which I am well informed may be much enlarged by transplantation. See Sect. XII. 6.

In these plants the leaves by exposing the vegetable blood to the influence of the air, prepare it for the secretion of nutriment in their knobby roots; in the same manner as nourishment is produced and reserved in the concentric fleshy bases of the leaves of onions; and in these plants, as in the onion kind, the leaves, which surround the base of the new stems, wither and die; as the new buds, or bulbs put forth leaves of their own for the purpose of oxygenating their blood. Thus it appears, that the stem and flower of the onion, or carrot, or turnip, is a new plant, not arising immediately from the seed which was sown, but from the leaf root or leaf knob, if it may be so called which preceded the production of the flower bud, or flower stem, exactly as the flower or ear of wheat, which was shown in Sect. IX 3 1. to have three or four successive leaf-buds preceding the flower bud.

From these observations may we conclude, that no flower-bud or flower-bulb is ever produced from a seed, without the previous interposition of one or more leaf-buds or leaf bulbs? and that those flower-buds or flower-bulbs are either produced in one generation after sowing the seed, as the flower-bulbs of onions, which are generated and nourished at the bases of the concentric cylindrical leaves of the preceding leaf plant, which arose from the seed; or as the stems and flower-buds of the carrot and turnip, which are generated and nourished at the base of the concentric leaves of the preceding leaf-plant. Or secondly, that they are produced in one summer, though after several generations from the seed: as the three or four joints of the stem of wheat, and other grasses, which are generated and nourished in succession in the bosoms of four or five cylindrical leaves, one at each joint: which also probably obtains in all other vegetables, which are supported by hollow stems divided by joints, and furnished with leaves at these stem-joints with or without branches, as tragopogon or picris. In these plants, where there are no branches, there is simply a new central bud; and two or more lateral new buds beside the central one, where there are branches.

Or lastly, where the leaf buds or leaf-bulbs, which are produced from seeds, succeed each other for some years, before they arrive at sufficient maturity to produce sexual organs, or generate a flower, as in the bulbs of tulips, and hyacinths, and the buds of trees. Whence we at length acquire a distinct idea, why seedling apple-trees are ten or twelve years before they bear fruit; though the buds or shoots taken from a tree, which already has borne fruit, and ingrafted even on a young seedling tree, shall produce flowers in the first or second year; as these buds have already acquired that state of perfection or maturity, which is necessary to the production of sexual or seminal generation; and as it therefore possesses the age of puberty, or the maturity of the tree; we may suspect, that it will sooner acquire the hereditary diseases consequent to too long unmixed successive generations, a piece of very important knowledge to the planters of orchards; which they owe to the observation of Mr. Knight, as mentioned in Sect. VII. 1. 3.

Hence in many plants produced from seeds, perhaps in all, one or more leaf-buds precede the flower-bud; and I suppose generally, if not always, a magazine of aliment is formed at the bases of the leaves, or in the roots, for the nutriment of the succeeding leaf-bud or flower-bud of which it is the parent.

Thus in the carrot and turnip the first leaves constitute the lungs of the new vegetable being, which generates the succeeding flower stem, and secretes or deposits for it a magazine of aliment, which forms the tuberous root; and then this first plant from the seed and its leaves or lungs perish; and the root gradually shrivels up, as it is absorbed by the new flower stem — In many plants these first or root leaves differ in form from those of the succeeding stem, as in palmated rhubarb, and in campanula rotundifolia, which is so called from the round form of the leaves of this first leaf-bud, or root-plant, which precedes the flower stem.

7. One great advantage of Mr. Tull's horse-hoeing husbandry, in which the earth near the rows of wheat is alternately turned from and to them during the vernal months, has been supposed to arise from some fibres of the roots being thus cut off, and new stems shooting up at the ends of those which remain; but the real cause of the production of the new stems is from the accumulation of earth above the first joint of the young wheat-plant: from which the new buds spring out, generated and nourished

by the caudex of the leaf, which surrounds that joint, and which afterwards withers; this important circumstance is shewn by the annexed delineation of a transplanted wheat-plant.*

The plant of wheat was taken from a corn-field in the spring, and then consisted first of the root immediately proceeding from the seed *a*, which has been called the seminal root; and secondly, of the root, which was then near the the surface of the ground *b*, which has been called the coronal root, was furnished with a stem and leaf, *c*, *d*, and with a secondary stem, or root-scion, *e*, *f*. This wheat-plant consisting of only two stems was replanted in my garden, and purposely buried so deep as to cover the two or three first joints of both the stems beneath the soil; that is as high as the letter *f*, where the secondary stem was purposely cut off.

On taking up this plant with some others on September 24, it had assumed the form here delineated. The primary stem, *c*, *g*, had shot out no new roots from the joint *g*, which I suppose to have happened from its being too far advanced when replanted; as many other stems of other wheat-plants, which had not been obtruncated, had nevertheless put forth one or more lateral stems or root-scions at the second or third joints, which on transplantation had been covered with the soil.

But the obtruncated stem *e*, *f*, had generated a new root-scion at *h*, like the first shoot from the seed at *a*; which had produced other new stems as it approached nearer the surface of the earth at *i*; and as these advanced into the air, and formed their leaves, other new root-scions were generated at *k* and *l*. Whence it appears, that by decapitation, and a deeper immersion in the ground, a secondary stem in this plant became multiplied into five; all which produced perfect ears of corn; and in other roots, which I had planted in a similar manner, the increase was much greater: and especially where one or more of the primary or secondary stems had been decapitated.

If a grain of wheat be dropped on the surface of the earth, and suffered to shoot down its roots, and to raise its stem, which is the process of nature, I suppose but one stem would be produced; as the first knot or joint of it would not be covered with earth, and could not therefore shoot down new roots; which are necessary in these plants to the production of new stems which are not branches but suckers or root-scions.

But if the grain be buried an inch deep in the earth, a shoot rises from the roots, which issue from the seed, which is an elongation of the caudex, and puts forth a leaf in contact with the surface of the earth; this leaf and stem constitute the primary plant and generate new buds, which put forth new roots descending into the earth; and thus three or four or more esuckers, or new plants, arise round the original one, which was contained in the seed: hence the appearance of two roots, which some authors have named the seminal and coronal roots. The ingenious Mr. Tull seems himself to have been aware of this circumstance, as he says in his Husbandry, "Late planted wheat sends out no root above the grain before spring, but is nourished all winter by a single thread proceeding from the grain up to the surface."

This explains the prodigious multiplication of the stems of wheat, which may be produced by transplanting it three or four times in the summer, autumn, and ensuing spring; for if it be so managed, that a second joint of each young stem be buried in the soil, or brought even into contact with it, so that new roots may strike down into the earth; the caudex of the leaf, which surrounds this joint will generate many new buds, which will thus become suckers, or root scions, and rival their parent; and may be again transplanted or earthed up three or four times with wonderful increase.—Mr. Charles Miller of Cambridge sowed some wheat on the second of June, 1766, and on the eighth of August one plant was taken up and separated into eighteen parts and replanted; these plants were again taken up and divided between the middle of September and the middle of October, and again planted separately to stand the winter, and this second division produced sixty-seven plants. They were again taken up, and divided between the middle of March and the middle of April, and produced five hundred plants. The number of ears thus produced from one grain of wheat was 21109, which measured three pecks and three quarters of corn, weighed forty-seven pounds seven ounces, and were estimated at 576840 grains! Philos. Trans. Vol. LVIII. p. 203. See Sect. XII. 6.

Nor is this unsupported by the analogy of other vegetables, in which new roots are liable to shoot in great abundance from their joints either alone or along with new buds, if a proper degree of moisture is presented to them. Thus if the stem of a potato be laid down upon the earth, and covered with soil over the first joint, a new series of roots will be protruded from that joint; and afterwards another series of roots from the second joint, if managed in the same manner; and it is asserted that this will occur even if the potato stems are taken out of the ground, when they are six or eight inches high and deprived of all their young roots, and transplanted, so as to cover one or two joints, and that a great crop has been thus produced.

The rapid growth of some grasses, and of some species of the convolvulus, and of colt's-foot, is well known, and very troublesome in many situations. Of these very minute parts of the jointed root, when cut from the parent, elongate themselves, and shoot up new plants. From the very numerous divisions of the wheat-root described by Mr. Miller, it may be suspected that something similar to this must have happened, which further observations must determine.

Vines also are thus liable to shoot out roots at their joints, and fig-trees when covered only with a shred of cloth in nailing them to a wall, if it be accidentally kept moist. And there is an apple-tree, which is called a burr-apple, because it puts out roundish protruberances or excrescences of the bark like a burr, which if the branch be bent down, or even torn off, and set in the moist earth, will immediately strike out roots, as I am told, and become a tree similar to the parent.

In the same manner I have been informed that if a circular ring of the bark be cut off from many trees and shrubs, which are otherwise difficult to propagate, and earth be put round the branch thus decorticated a few inches above and below the wooded part, by means of a garden-pot previously broken longitudinally, and bound together round the branch, that roots will shoot from the upper lip of the wound; and in a little time the branch may be safely cut off below the garden-pot, and planted with success.

When a few inches of the end of the branch are cut off in the spring, as is common in pruning wall-trees, new buds are produced near the extremity, which remains; or those, which did exist, grow with greater vigour; as they obtain some of that nourishment which should have supported the buds, which were cut off. The same occurs in respect to the suckers or root-scions of those trees, which produce them, as of elm-trees, and of some apple-trees; if many of the branches be cut away, the suckers or root-scions become more numerous, or more vigorous.

* See Am. Farmer, No. 45. Vol. 3.

FROM THE (SCOTCH) FARMERS' MAGAZINE FOR NOV. LAST.

On the Burning of Clay for Manure,

By W. Aiton, Esq. Sheriff-substitute, Hamilton.

Sir—It must be pleasant to every lover of his country to contemplate the progress of Agricultural improvement during the last forty, but especially within the last twenty years. The establishment of the Board of Agriculture, with the publication of their communications, the county surveys and other works, have had powerful effects in collecting and diffusing valuable information. Those who have written on different branches of husbandry being eager to render their works creditable to themselves, and useful to the public, have sought materials from every possible quarter. Others by reading, and reflecting on what they did read, have not only added to their own stock of knowledge, but, in many instances, have improved on the ideas of the author whose works they perused, and reduced his and their own improvements to practice. And even some who could not compose, and did not read much, have made useful discoveries, and instructed others verbally and practically in various branches of husbandry. The state of Agriculture during the last six years has no doubt greatly damped the ardour of the cultivator; but, even during that unpropitious period, many useful discoveries have been made, and much Agricultural knowledge has been diffused. Almost every new publication contains something interesting; and every number you publish either lays open some new discovery, or developes some improvement in practice. And as every one of these leads to further discoveries, and to higher improvements, we may still look forward with confidence to much greater perfection in every branch of husbandry.

It may well be expected, however, that, in a science so extensive, so very far from having attained perfection, and where so many thousands are as it were searching for improvements, and eager to give their discoveries to the public, that some, with even the best intentions, may be themselves deceived, and without intending it, may for a time deceive others. Hence we have sometimes found, that what have appeared to be important discoveries, and have been warmly recommended as interesting improvements have not been found to be of much importance. Of

several instances that migh be named the *Fiorin Grass* and *Burned Clay* for manure may serve as specimens Both of these were improvements to a certain extent, and meriting some attention; but both have been recommended far beyond their worth. Dr Richardson had the merit of bringing into view a species of grass of considerable value, which had not been attended to by any other person; and, in his desire to serve the public, he very much overrated the value of that grass. The fiorin is certainly the richest in quality of all our grasses; abounding with saccharine matter, and well adapted for green food in winter, when no other grass can be preserved in that state. But to talk of rearing it under trees, on mountains, and in other situations pointed out, or to the extent mentioned by the Reverend Doctor, or those who became believers of all his statements, betrays a considerable degree of rashness and credulity.

In the same way, the burning of clay as a manure has been recommended far beyond its real merits. It must be obvious to every person that has paid attention to the subject, that when clay, or other earth, is burnt into ashes like brick-dust, it will not (unless acids are applied to it) return again to its former state of clay, but will remain in the granulated state of ashes or friable mould, to which it was reduced by the operation of burning, or torrefaction, as it is sometimes termed by fashionable farmers. An admixture of that kind with a strong adhesive clay, must evidently operate as a powerful manure, by changing the mechanical arrangement of the latter, and rendering it more friable; giving greater facility to the percolation of redundant moisture, and to the spreading of the roots of vegetables in quest of food The application of as much washed sand, or any similar substance, would have exactly the same effect in opening. and keeping open, the pores of an adhesive clay soil, and converting it into the quality of loam.

Besides this, which would be a permanent improvement upon the staple or texture of every clay soil, burnt clay or torrefied earth may sometimes acquire, in that operation, a small quantity of soot or carbonic matter, that may, in favourable circumstances, operate for one season as a manure, or as a stimulus to a small extent, to the growth of vegetables. This at least may be the case, if the clay or earth burnt shall abound with vegetable matter, and if the burning is conducted in such a smothered way as to prevent the smoke or vegetable matter from escaping But as it is the subsoil that is recommended, and seems to be generally used for burning, it is impossible any considerable quantity of vegetable matter can be found in it.

Much has been said by the advocates for this species of manure about the calcareous matter in the soil being calcined and formed into lime by the operation of burning. But I am disposed to consider this argument as far more plausible than solid. Calcareous matter is no doubt found, on chemical analysis, to a certain extent in some soils; perhaps some perceptible portion of it may be found in every soil. But it is seldom or never found in any soil, to such an extent as to be of much use as a manure to other land. Even where the soil is impregnated with a large portion of calcareous matter, if it is not in the form of limestone, but minutely mixed with it, the burning cannot either increase or much alter the lime. If it is in the form of stones, however small, or in what is called limestone gravel, there is little chance of its being calcined in the operation of burning the clay; it would go through that ordeal unaltered. Any change, therefore, that can be made upon the small portion of calcareous matter in the soil by burning in the manner directed, can scarcely have any perceptible effect, when that matter is applied as manure to other soils. And though it is possible that some qualities in particular soils, unfavourable to vegetation, may be corrected by burning, and that in some other instances the fire may render the clay more nutritive to plants (though I have not been able to trace this, or even to conjecture how it can happen,) yet I am much disposed to believe, that its effect as a mechanical mixture in opening the pores of the soil is the chief improvement that can be derived from the application of burnt clay as a manure. If it has any other effect, it must be from the soot or carbonic matter collected during the operation of burning; or perhaps it may acquire, by the torrefaction, something of a stimulating quality, that may for a short time promote the growth of particular plants. But these qualities can only be to a small extent, and continue to act for a very limited period.

Having thus stated my own opinion and belief as to the utility of burned clay as a manure, it is not necessary for me to say much upon the high recommendations given to it by those who first brought it into notice, or by others who have, either in theory or practice, entered into their views. It is far more agreeable to me to give my own opinions on any subject, than to dispute those of others. Though I have no scruple in stating, that the recommendation given of the fiorin grass by Dr. Richardson, and also the first accounts of the effects of burnt clay, to both of which some respectable gentlemen became proselytes, were greatly exaggerated, still, as I believe the writers of these accounts, and those who believed in them, acted from principle, and had no intention to deceive the public, I would be sorry to say any thing to hurt their feelings, and would only caution the public against being misled.

The first account I ever saw of the powerful effects of burnt clay as an efficient manure to every soil, was in some communications from Mr. Alexander Craig, at Cally in Galloway, who recommended it so highly, that one might have expected it was to supersede all other manures. He says that Mr. Wallace, a tenant on the estate of Tongland, who had began to use some of this manure, was so fully convinced of its superior efficiency that he would not be at the trouble of carting dung from Kirkcudbright to his farm, though only a mile and a half distant, even if he were to get such dung in a present. This was certainly carrying the matter a great way too far; yet such was the demand for labourers capable of doing justice to the operation, that Galloway, and even Ireland, was ransacked for clay-burners. Clay-kilns were seen smoking in all directions; and the newspapers and periodical publications were often filled with the most flattering accounts of the newly discovered manure Some of these accounts contradicted each other, as might well have been expected, on a subject so new, and respecting which several people seemed eager to be heard, and to repeat their improvements and detail discoveries

But this rage for clay-burning did not continue long for, though the thing was only started in 1815, I have not seen a kiln burning during the last three or four years; and none of the original believers in its efficacy, within the circle of my knowledge, seem now disposed to speak upon that great improvement.

Having stated my opinions on the subject some years ago, I did not intend to repeat them, till I saw in your last Number, what Edward Burroughs, Esq. has recently published, respecting the effects of burnt clay as a manure. I am not disposed to follow this author through the course of his pamphlet; or if I were, I would be inclined to contradict several of his propositions He makes a distinction between burning into ashes, which, he says, is suited to the subsoil, and what he calls torrefying, which is all that is to be done, when soil abounding with vegetable matter is used. His object seems to be, to preserve the vegetable matter from being dissipated by fire. But it would be proper to know how far the fire can be allowed to proceed, without injuring the vegetable matter. Burning and torrefaction are so nearly allied to each other, that I do not know where the one begins and the other ends. Torrefaction is synonymous with scorching or roasting; and I do not perceive that any one could ever consider the burning of the clay into manure was any thing more than roasting it into ashes. It was surely never meant to burn it up by fervent heat, otherwise no manure would remain. But wherever Mr. Burroughs may draw the line between burning and torrefaction, I have no scruple to aver, that either the one or the other will completely dissipate the vegetable matter in the soil. That matter is so much more inflammable than clay or common earth, that it will be burnt up and expelled from the mass before the heat has advanced to that degree that could make the least change on the clay, beyond drying it, which might be done by exposure to the sun and droughts without the aid of fire. If merely drying the clay is what Mr. Burroughs means by torrefying, then certainly the vegetable matter will not be much injured by that operation. But whenever the fire is applied, the vegetable matter will be dissipated. If, by torrefaction, is meant no more than drying, then fallow only, and not fuel, is necessary. But if the clay is only dried, then the first heavy rain will reduce it to its former adhesive state; and neither it, nor the soil to which it is applied, will be in the least altered, in its mechanical arrangement, beyond one season, as in the case of ordinary fallow.

To give my ultimatum upon this subject, I regret that the discoveries of fiorin grass, and the effects of burnt clay, have so far overated their value. Both are useful and proper to be attended to—the grass to be raised on patches of marshy ground, and used as green food to cattle in winter; and the burnt earth as a corrector of the mechanical arrangement of a stubborn clay soil; and I have no doubt, but if they had been only recommended for these valuable purposes, they would have been brought into more general use than they yet are, or will be, till the prejudice against them, arising from the disappointment of expectations, raised high by too flattering descriptions, are removed.

I see Mr. Burroughs quotes Mr. Nasmith in support of his theories on this subject. But if he had seen, as I have done, that all Mr. Nasmith's experiments with burnt earth or brickdust, as he termed it, did not extend to more ground than an ordinary pair of blankets would cover, and was chiefly confined to experiments in flower-pots in his byre, he would not probably have referred to such authority. Speculations raised, and theories built upon such trifling experiments, will when so well told as Mr. Nasmith was able to do, mislead people at a distance. But none who saw them will be so easily deceived. Much injury has frequently been done to agriculture by extravagant theories and visionary speculations.

I am, &c.

WILLIAM AITON.

Hamilton, 12th October, 1821.

For the American Farmer.

ON THE PREPARATION OF

CHEWING TOBACCO.

ESSEX, February 15th, 1820.

Dear Sir,

I am gratified that it is at last in my power to give you pretty full information in reply to your inquiries, relative to the modes, for there are several, of preparing our Chewing Tobacco One part of this information will probably surprise you, as much as it did myself. This is, that the best manufacturers of chewing tobacco on the continent, are said to be in Baltimore. One of the most experienced and respectable manufactures in Richmond, gave this answer to the Secretary of our Society, who was so kind as to make the inquiry for me; and he added, in confirmation of his opinion, that his own foreman had always been from Baltimore. The tobacco is purchased in Richmond by agents, appointed for the purpose, and sent round to your city But to "make assurance doubly sure," I also made inquiries of several planters and farmers, who concurred generally in the following statement. That in the large way, the chewing tobacco was prepared chiefly in what are called "stemmaries,' established in the towns of Richmond, Lynchburg and Petersburg. That the best tobacco is always selected, either from such as the inspectors reject from being "too high in case," or from such as is very dry.—This last they throw into bulk on blankets or cloths; water it plentifully, by which they calculate on ten pr. ct. profit in the additional weight, and then cover it up. As soon as it is sufficiently in case to stem, this process is performed, after wiping

each leaf perfectly clean with a cloth It is then twisted, and subjected, when in the proper order for prizing, (which is a matter to be learned only by experience,) to very heavy pressure for three or four days either in strong tubs or boxes, when it is taken out, and the twists reversed; after which it is again prized firmly into the vessels designed to contain it for sale. Where it is prepared in the small way, some prefer letting the tobacco get into "case," from the natural influence of the atmosphere; and after the first prizing with great force, take out the twists—nearly open the twists, by giving them a reversed turn by the hand, and then suffer them to dry for a day or two, when they are again prized for use. This method is said by many, to make far superior tobacco to the other, but it does not answer so well in the large way.—Some experienced consumers of chewing tobacco contend that it ought never to be prized at all, as the heavy pressure destroys what they call "*the fine flavor and taste*" of the article. For my own part, I neither make, nor use tobacco, having adopted pretty much the same opinion of it as is expressed by old Burton in his Anatomy of Melancholy—the most curious perhaps, of all the curious books, that ever was written. It was published in the early part of the seventeenth century, and subjected the author to the suspicion of being somewhat crack brained. As I hope the same doubt may not attach to those who quote him, I shall venture to give you the passage, which may serve to amuse, if it does nothing else.

"Tobacco, divine, rare, superexcelent tobacco, which goes farre beyond all their panaceas, potable gold, and philosopher's stones—a soveraigne remedy to all diseases—a good vomit, I confesse—a vertuous hearbe, if it be well qualified, opportunely taken, and medicinally vsed, but as it is commonly abused by most men, which take it as tinker's doe ale—'tis a plague, a mischiefe, a violent purger of goods, *lands*, health; hellish, develish, and damned tobacco, the ruine, and overthrow of body and soule."

I would not have you think me quite as violent as old Burton in my denunciations of this favorite weed, or "hearbe," as he calls it, but I certainly think there is much truth in what he says—somewhat too coarsely expressed to be sure, for modern tastes, but still true in the main. I wish some of our farmers, who are killing their lands with it, would imbibe the old gentleman's notions, so far as to abandon its culture for more improving crops.

What remains to be said on this subject, I must give you, as concisely as possible. The soil which is preferred by our best planters, is a generous, black loam—the hills are made from 3½ by 3½ to 4 feet, according to the fertility of the land—much tobacco is cultivated with the plough, in beds, broken up in the fall. The best kinds are called "Big Frederick, Daniel, Jones, and Blue Prior," of which the first is most esteemed; all the different kinds are topped from eight to ten leaves cured with fire, and prized to an average weight of some 14 or 15 cwt. pr. hhd. The planters inspect where they please, sell to the merchants generally by actual view, and carry most of their tobacco to Richmond and Petersburg before it is sold. The legal size of our hhds I believe, is 54 inches by 34, and the inspectors are required by law, to break in two places, but often break the hhds. in more.

FOR THE AMERICAN FARMER.

Distillation of Rum or Spirits

As conducted in Jamaica, with remarks on Cisterns or Vats, and Stills.

PHILADELPHIA, Dec. 22d, 1821.

The following directions for the distillation of Rum, were written at my request, by the worthy Mr. William Hylton, formerly of Virginia, shortly after his return to Jamaica, from the United States, and as they may be useful to those engaged in the business, and the cultivation of the sugar cane, I send them to you. I have not heard from him for several years past, and know not whether he be still living.

JAMES MEASE.

MR. J. S. SKINNER.

EXTRACT.

First. The vats or cisterns, (which to equalize, as much as possible to the changes of the American clime, I would advise to be placed under ground, and to have *covers* and *pads*, over them in winter,) *ought* to be of *the same* size as the *liquor* still, *when* they are filled within six inches of the top of the vat—there is great escape of spirit if they are filled higher.—Note. From much observation, I am persuaded, *small* stills yield *more* spirit than *large* ones, which are now generally used in Jamaica.

2d Experience has lately proven to *me*, that shallow vats or cisterns work off *quicker* than *deep* ones The fermentation is *less* impeded, and is more complete. I have made *two* this year, of 9 and 10 feet square, and 3 deep, set in clay *puddle* (in place of ramming them) which work off in three days after being set with sweets, &c. whereas those of five feet deep, of the same quantity of gallons, take five days. *Round* vats I prefer to *square*, as they are easier made *tight* with puddle or ramming—two inch white pine will make them; and they may be doweled and hooped with wood

3d Twelve to fourteen cisterns or vats, will make (in Jamaica) 12 puncheons of rum per week, if they are 1000 gallons each.

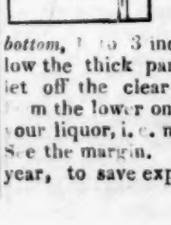
All sweets yield *best* when *fresh* and *new*. Molasses sent to America undergoes a strong fermentation before it reaches there; and occasions an acid flavor and *hogo* in the spirit. The empyruema is sometimes *got* rid of *here*, by putting 6 gallons of lye to each 1000 of liquor, or by not mixing the *first* and *last* 15 to 20 gallons of low wines or runnings, *first* and *last*, with the product of the still—say, 280 to 320 gallons of low wines, from 140 gallons of *good* molasses, or its equal in sweets, of skimmings and cane juice. Six gallons of skimmings, eight of cane liquor, to one of molasses

The above quantity of molasses, you will perceive, is 14 *per cent.*, a *high* but not profitable set, adopted from scarcity of fuel; 12 *per cent.* is more productive, thus,—molasses 12 per cent. water 40 to 45 per cent. mixed as below—*Dunder* (or returns of the liquor still,) cooled and settled, as directed, 48 per cent.

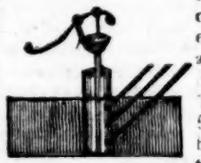
4th. A large vessel capable of holding the quantity of molasses, used for one cistern, and *twice* as much water, made like a bumpkin, to have a shaft and cross paddles at and through the foot of it—(like the old washing "*Dum Betty's,*") should be placed *convenient* to the whole cisterns, and elevated with a cock to run off to them, the liquor *when* mixed, by being well churned, with a crank handle fastened to the top of the shaft.

This is an old plan of my own, but was laid aside after I left Jamaica, and is now again renewed. Its principle is clear. The specific gravity of *sweets* is so much more than water, &c. which cisterns are made up with, that great part of them, (especially in the deep cisterns,) settle at the bottom, and are not fermented; but are thrown away with the residuum of the cistern, as it is cleaned.

Dunder is cooled and clarified in various ways—mostly, by having two vats or cisterns; one or two near or under the still cock, as high as it will admit it, and wide as you can have it to cool quickly. In this or *these*, you have a cap with collar to fasten over a hole at the *bottom*, 2 to 3 inches above the surface of it; to allow the thick part to settle, and a plug to stop or let off the clear dunder into another vat below it; from the lower one, the dunder is pumped up, to mix your liquor, i. e. molasses and water 52 to 57 per cent See the margin. But I have adopted a new plan this year, to save expense of the lower dunder cistern—



that is, a large hollow trunk of a tree, one foot diameter, 2 inches longer than the depth of the upper or *lower* vat, is placed upright, with its foot let into and corked at the bottom and secured fast by a frame at the top. This tube has holes in it, at 6 to 9 inches asunder, and 4 from the bottom, to which plugs are fixed to draw out and let the dunder in, as it settles from the surface The pump is fixed in the tube or trunk, to pump up the dunder as it clears, and is let in by the plugs drawn. I give an imperfect sketch in the margin.



Stills should be made flat or *squat*, to afford the action of fire, *on as great a surface as possible*, and to *force* up vapour or spirit *in the perpendicular line it rises*. This idea I suggested in 1789—sent out for a still of 1600 gallons on my own plan in 1790, and hung it in 1791. Before *it* was made and exposed to view *in* Bristol, I verily believe, flat stills were not thought of. Experience has since proved their superiority; as also of *copper* goose necks to the head, instead of pewter. The head to be one-third the contents or size of the still. My still is three times the diameter of its depth.

Low wines (as here called, run from liquor; mixed as here described) are put into the small still or rectifier of 300 to 500 gallons and its runnings (until it gets down to the proof of low wines again, which is put by and mixed with the *liquor* low wines) are put together, to make our rum of bubble proof 22, equal to Dicas. Hydro, *5th and one half class*, American proof for duty.

But when choice rum is wanted, the *first* and *last* few gallons (which has the empyruema) are put also by and not mixed with what is kept for use—as in the liquor or first running. If to every 100 gallons of this rum, you add one to two lbs. of carbon—you have fine flavored rum, and by shifting your rum thus made, three or four times from one puncheon to another, by passing it through a quill into a cullender standing over and *two feet above* a large tub to catch or receive it, to remove again into the puncheon, you make rum six weeks old equal to three or four years! i. e. one year to every shifting or discharging it. A similar mode to purify water, is used in the British Navy, by allowing the air to act on *every* particle.

FOR THE AMERICAN FARMER.

CORN.

Locust Level, Frederick County, February 3, 1822.

Considering the extensive circulation which your paper has, this may not reach its extreme subscribers, before they may be preparing to plant corn I will state an experiment, made last Spring (claiming no merit, as it was not intentionally, but Providentially) my first plantings were done the last week in April (prefer early planting, it shoots lower, fills better and less risk of frost in the fall) in part of a field, which had been in clover the three preceding years; the ground was broken up deep early in the spring, twice well harrowed; then furrowed out shallow five feet apart; the corn drilled and covered with the plough, followed by a light one horse harrow over the corn. This planting was nearly destroyed by the Cut-worm On 23d May, corn was put into a large bucking tub, with brine made of saltpetre, for planting same ground owing to a heavy rain prevented as intended, and the corn remained four days in the brine exposed; fearing it would sprout too much, had it taken out into baskets to drain and put in a house, as the ground was still too wet. (I prefer planting, when its what we term dry); on the 29th, prepared to plant, when, on examining the corn, found it very warm and in a high state of germination, some grains having two or three roots from one to three inches long, besides the shoot which was only about one half inch—they were tough,

not easily to be broken or pulled off. I hesitated planting it, but finally concluded to try the experiment The ground was new furrowed out, as near between the old furrows as practicable. The sprouted corn was exhausted before the ground was completed, the balance was finished with corn only immersed in the brine; it was all covered very lightly with the hoe. (As I now suspected the first planting was covered too deep, though done with the view of counteracting the cut worm, it had, I believe, the contrary effect; for they, like all other pests of society, when committing depredations, prefer darkness to light, and cut it off below the surface.) In forty-eight hours after planting, the sprouted corn was visible, and kept ahead of the others, evidently discernable to the eye, and more so when gathered by measurement.—The ground being equally good, I have my corn thinned as soon as it can be pulled up by the roots—never suffer it to be cut off—also, top before blading, believing its a ben fit to the corn, to top it even before its perfectly filled, provided they are cut above the joint over the ears—the roots then have less to nourish and support, and winds do not blow it down.—Blading too soon injures the corn by robbing it of part of its nutriment. I gather my corn by husking it on the stalks, having carts or wagons along to receive it as husked, without its touching the ground, it being much the most expeditious, and safest way—five good hands can secure, if the corn is large and convenient to the corn house, forty barrells, or two hundred bushels a day.

Sir, I forbear stating the number of bushels I raised from the acre, as it was so far short of what I have seen stated to have been raised in the Eastern States, where their land and climate is not superior by nature—I will inform you as soon as (if ever) I can equal or excel them, by fair measurement,

From your Friend, and
Very Humble Servant,
JOHN HUGHES.

P. S.—Part of same field, and alike clovered, was broke up the preceding fall or winter, and planted in corn about 1st day of May, which was very little injured by the cut worm, except a few rows adjoining that not broke up, which proves the utility of fall, or winter ploughing to prevent this worm, also that they can travel a short distance to do mischief. J. H.

From the Philadelphia Democratic Press.

WOOL, HEMP, FLAX AND POTATOES.

We have for some considerable time laboured to impress our country readers with the conviction that it was their interest, and the interest of the nation, that they should pay more attention to the growth of the several articles which head this paragraph. That their convictions should be deep and permanent, we have from time to time presented them with such facts as were best calculated to impress this great truth upon their memories. We have stated and repeat that to our knowledge for twenty years there has not been grown in Pennsylvania as many *Potatoes* as the inhabitants have actually consumed, and they would have consumed many more had they been plentifully cultivated: and we have stated and repeated that for twenty years, *Potatoes* have been the most profitable crop to the cultivator in Pennsylvania. This was true, even when our Bread stuffs brought the high prices they did in Europe.

We have also stated and repeat, that we send large quantities of *Flax seed* to Ireland, and not only import it from that country manufactured into Linen, but we import large quantities of the flax itself, grown from our own seed, for the purpose of feeding our manufactories, and they would be more numerous and extensive than they are, if our Farmers would grow flax in greater abundance. Flax is always in demand and brings a good price, Rich in industry and ingenuity, with a fertile soil and climate we could grow abundance, yet, when our Navy Commissioners contract for materials to float our Star Spangled Banner, we are obliged to go Cash and Cap in hand to the dominions of the crown of Great Britain, to pray them to let us have as much flax as will make sails for our little navy. Is not this a shame? If neither self-interest nor the interest of the country are sufficient to stimulate us to the growth of Flax, let us call in our individual and national Pride and let them goad us to its growth at all events and from whatever motives—let Flax be cultivated abundantly.

Are not these statements sufficient encouragement to plant Potatoes and grow Flax, especially when our Bread stuffs are on hand in large quantities.

A few words with respect to Hemp and Wool. At the port of Boston alone and it is the only port we have heard from, there has been imported, since the peace, two hundred thousand pounds of Wool. All the wool in the nation is worked up and we are obliged to go abroad for wool to keep our manufactories agoing at a time when, if our farmers would turn their attention to the subject, we might not only grow Wool enough to feed and increase our manufactories, but we might export enough to keep warm some thousands of shivering wretches.

With respect to *Hemp* the case is still stronger—Within the last year, as is proved by the report of the Secretary of the Treasury, we have imported nearly *eight thousand tons* of Hemp and hempen goods. Aware that this fact will stagger belief, we shall subjoin extracts from the official report to prove what we have said. Of the quantity thus imported it will be seen that nearly one half in weight, and three fourths in value of the articles were manufactured abroad We note this fact to shew our Farmers that if they would grow the Hemp, they would not only put money in their own pockets and keep wealth in their own country, but they would find means to employ some thousands of their fellow citizens in the manufacture of it. This would be another obvious advantage to them All those thousands must eat and drink and have the necessaries and comforts of life, and it is the Farmer who must supply them The more manufacturers the more consumers, the more consumers the greater demand, & the greater the demand, the higher the prices. Would not all this be the better for the Farmer and the Nation? Let every man answer for himself.

An account of the Hemp and Hempen Goods imported into the United States, during the year 1820, abstracted from the Report of the Secretary of the Treasury.

	Tons.	cwt.	qr	lb.
26,859 pieces of Russia Duck, equal to	599	10	2	14
16,185 do Ravens do	159	0	0	11
1,814 do Holland do	49	0	2	22
4,486 do English do	100	2	2	20
27,000 do Cotton Bagging, each 32 yds. equal to 1,180,000 yards,	1508	2	1	16
14,738 do do brown Russia Sheeting,	163	0	3	15
643 do white do	7	3	1	14
267 332 lbs Cables and tarred Cordage,	119	6	3	10
246,321 do untarred do	109	19	0	6
223,793 do Twine,	99	18	0	14
93,707 cwt. Hemp,	4685	7	0	0
Total Tons	7691	11	3	13

COMMUNICATED.

To prevent Dogs from Sucking Eggs.

Take of emetic tartar from four to eight grains, according to the age and strength of your dog, break the end of an egg, put in the tartar and mix it—if your dog is disposed to suck eggs, he will readily eat it. Confine him from cold water—the next day repeat the dose, which continue to do on each succeeding day until he refuses it, which will probably be the third or fourth day. After this, I have never known them guilty of the like offence—instead of being the destroyer of our good wives poultry, the same dog becomes their faithful protector.

Will you, or some of your correspondents give us information of the best course to pursue to prevent hogs from being infested with vermin, and how to destroy the vermin when they are infested.

A VIRGINIA FARMER.

January 21, 1820.

CATALPA OR CATAWBA WOOD.

MR. SKINNER,

Dear Sir,—Do you know any thing, or can you obtain authentic information from any one of your numerous correspondents, concerning the durability of the Catalpa or Catawba wood, when put in the ground? I have heard, and on good authority, of a gate-post of this tree in Vincennes, Indiana, which has been in the ground for forty years or more, and is yet in a sound state. If this be the fact, or if it will last as long as Black Locust, Mulberry or Cedar, it is certainly better worth cultivation as it grows much faster. I should judge, in favourable situations the tree would grow sufficiently large in ten years, from the seed, to answer the ordinary purposes of post and railing.

Very respectfully,
A SUBSCRIBER.

HOPKINSVILLE, KENTUCKY,
January 8 1821.

From the London Farmer's Journal.

RECEIPT FOR MAKING GREEN GRAPE WINE.

Lewisham Nursery, Oct. 7, 1821.

Sir,—Having for a number of years been very fortunate in making British Wines, I herewith send you a receipt for making Green Grape Wine, which is particularly applicable this late season, as there are many farmers, and others in the country, who have large quantities of grapes that will not ripen, and which they will find, by making use of them in this way, will turn to a very good account. Care must be taken to have the casks, bottles, &c. very sweet and clean, and I have no hesitation in pronouncing this the finest British wine that can be made.

I am, Sir, your obedient servant,
JOHN WILMOTT.

To make Champagne from Grapes, equal to FOREIGN.

Gather the grapes when they are just turning, or about half ripe; pound them in a tub, and to every quart of berries so pounded, put two quarts of water—let it stand in a mash-tub for fourteen days, when it is to be drawn off—and to every gallon of liquor put three pounds of lump sugar: when dissolved, cask it, and after working, bung it down. In about six months it will be fit to drink, when it should be bottled and tied down, or wired, if it is intended to be kept more than one year.

On improving exhausted lands

IN PENNSYLVANIA—BY WILLIAM PAINTER.

[Communicated for publication in the American Farmer, by G W. Jeffreys, of North Carolina.]

Painter's Cross Roads Pa Second Mo 18th, 1819.

DEAR SIR—I received thy letter in the 9 Mo last; at that time I was busily employed in rebuilding my barn (which was distroyed by lightning last year,) that, with my many other engagements at that time must apologise for my silence I much approve of Agricultural Societies, especially where the members are practical farmers- I shall now give you such information as has come under my notice First, with respect to the improvement of exhausted lands; the method I have pursued (as my land was ten years ago principally of that description) is as follows: one farm of 100 acres of cleared land, divided into 8 fields of 12½ acres each, the latter end of the 3d and be-

ginning of the 4th mo. (March and April) I sow the whole with 5 pecks of plaster of parisper acre with 50 bushels of stone lime per acre on such parts as are intended for Indian Corn; in my commencement of farming I planted two fields of the above discription in order to bring them sooner into grass, and to destroy the briars and brambles, with which the land was much overrun.—It is a common practice to commence ploughing for Indian Corn, about the 10th of 4th month; we plough our hilly light lands from 5 to 7 inches deep, then spread the lime and harrow it in sufficiently to incorporate it intimately with the surface of the land; as leaving it for dews and rain to fall on, will form it into a hard crust, in which case I believe one half of the beneficial effects are lost for a considerable time, as it will remain in that state for many years.—We then throw two furrows together as deep as it will admit, without disturbing the sod (if any); then cross at right angles in single furrows, making, the squares 4½ feet, three stalks in a hill at this distance is sufficient—but if there should be any appearance of the grub worm, (which has destroyed many crops in this part of the country, for two or three years past) I would recommend the following method.

Take an iron bar pointed at one end, or where they are not at hand, a piece of strong wood, say five feet long pointed with iron. One foot from the end insert an inch pin, where the main stick should be two inches in diameter, with a regular taper to the point.

Then plant 8 or 10 grains in a hill, pressing them down with the bottom of the hoe; one person with either of the described instruments will readily make holes ten or twelve inches deep, as fast as another will cover the corn. I preferred the wooden instrument, as it was much lighter than the iron bar, and with the assistance of the foot on the pin I could make them with ease—the holes may be made in the centre of the hills; if one or two of the grains should be carried down with the instrument, there will be sufficient left; the value of seed corn being so small, a certainty of insuring the crop ought to be a great consideration—I have pursued this method with great success when my neighbours have had their crops mostly cut off with the worm, though they replanted three or more times, which is double the work to insure it the first planting.

The worms in searching for food for several days, while there is no living vegetable substance on or near the surface, the corn not having vegetated, they principally fall into the graves prepared for them In the years 1816 and 1817, I believe the worms averaged from eight to ten in every hole in the field, which would have been sufficient to have destroyed ten times the usual quantity planted.—The corn was planted the first of the 5th mo.; about the twentieth we began to replant, when in going over the field I believe there was not one hill in one thousand missed, though the worms were as thick as I ever saw them in any land, before we planted; of course it was unnecessary to go over much of the field. I then plough up the middles, when the corn is three or four inches high, and cross the ridges with a hoe harrow twice in a row, with a child or two of 10 or 12 years old, with a small hand rake with 4 teeth three inches long and two apart in the head, to loosen the ground in the hills; that leaves the ground in a fine state fo vegetation.

I prefer the hoe harrow in the cultivation of the crop on light lands, before any other implement in use with us, as it leaves the land level and not subject to wash; about three times crossing twice in a row is sufficient if done before the ground gets foul, to keep it in good order the whole season, which is much less labour than ploughing, and leaves the land in better condition for a spring crop—with this culture I have saved from 40 to 50 bushels of corn per acre in the commencement of my farming and a greater quantity after the second and third liming of fifty bushels per acre—As soon as the corn is well out of the milk, it ought to be cut and set up in shocks; the plan I have taken is to bind the tops of four hills together with a handfull of blades, at such distances as will make 150 or 200 hills in a shock; then tie it round with straw or corn stalks, let it stand until you have leisure to husk it, when you may put four heaps or shocks together; it may stand in this situation until used. A common worn out grass sythe cut in two, will make two good instruments for cutting the corn, which you may hold with one hand and cut with the other while you can conveniently hold the corn, then set it round the hills tied up. Fodder saved this way will winter a bullock of 600lbs. to the acre, with straw once a day, and keep them in fine heart—In our common rotation of crops, oats or barley succeed the corn crop, which ought to be sown the first of the 4th mo.; oats in a fine season will produce 60 bushels, and barley from 25 to 30 bus. per acre: soon after harvest draw out all your manure, and plough it in three inches deep; never disturb the soil to the bottom from the first ploughing, as it is thought best to keep the lime and other manure near the surface.—It was formerly my practice to heap my manure early in spring, but from the many experiments I have made, I think it better when the cattle go to grass to cover the manure in the barn yard with earth an inch or two thick, and let it remain in that situation until you are ready to draw it out In case it is thrown up in large heaps, we certainly lose one half in excessive fermentation. The ground with one harrowing is now nearly ready for the wheat crop, which on hilly land we first plough and harrow in, where the land is flatter we plough in lightly—Sow two quarts of timothy seed per acre before any rain falls, as in the loose state which the plough or harrow leaves, it covers it much better than brushing it in, as that covers many of the seed too deep to vegetate. The first of 4th mo. sow four quarts of red clover seed to the acre. The plaster of paris I sow on all my land every spring, and sometimes after harvest on the young clover.—My situation five miles from the Delaware, is very uncertain, for wheat crops, as the snows lay but a short time to what they do in the more interior parts of the state- I have raised from 15 to 30 bushels of wheat per acre, and in one or two instances near 40 on small parts of a field.

I have lately been 30 miles to see the operation of burning earth, which appears to me to be the best source of manure, I am acquainted with. I intend trying it this spring; if it answers my expectation, I will forward the process in a communication.

With respect I remain thy friend,

WILLIAM PAINTER.

From the London Farmers Journal of Aug 26 1821.

ON THE WOOL TRADE.

SIR,

An error of some importance seems to have crept into one of our daily newspapers, (I forget which) and as the subject relates to agriculture I hope you will not object to correct it, especially as it may lead to objects and communications of some consequence to the community at large

The paper stated that Wool from Van Dieman's Land had sold in this country at 10s 4d per lb I was present at the sale of the Wool alluded to, and I was attentive to the prices and noted them down, which I have copied, and now send them to you. It was sold by Messrs. Marsh and Ebsworth, of Coleman street, on the 17th August last, at Garraway's Coffee House.

Lot 1.	three bales lambs' wool,	2s.	7d.
2.	three ditto	2s	6d.
3.	two ditto	2s.	5d.
4.	three ditto ewes' wool, &c.	2s.	5d.
5.	two ditto ditto	2s.	9d.
6 & 7,	seven ditto ditto	2s.	6d.
23	three ditto ditto	2s.	7d.
24	three ditto ditto	2s.	10d.
8, 10, 13, 22,	ten ditto ditto	2s.	11d.
9, 25,	four ditto	3s.	
26,	three ditto	3s.	1d.
12 14,	four ditto	3s.	3d.
15,	two ditto	3s.	5d.
21.	one ditto	3s.	6d.
11, 20,	three ditto	3s	7d
16,	two ditto	3s.	8d.
17.	two ditto	3s.	10d.
18,	two ditto	5s.	6d.
19.	one ditto	10s.	4d.

The above lots were sold to manufacturers, and the last lot purchased by Mr. Hirst, of Leeds.

The opinions passed upon this and the other lots were unanimous as to its superior quality, compared with that from Spain, and with a few exceptions, from Saxony.

The history of the lot nineteen I have extracted from a memorandum of the year 1803, and it is this:

"*New South Wales Sheep.*—Mr. M'Arthur has brought over some wool of these sheep, and it appears that it is equal to the Spanish, its value about 4s. to 6s. per lb. They are originally Spanish sheep, sent by the Dutch to the Cape, and from thence they were purchased and taken to port Jackson Mr. M'Arthur crossed all his mixed bred ewes (which being from the Cape were large,) with a Spanish ram, and he proposes to supply this country in about twenty years with wool equal to Spanish, which is now done at an annual expence of £1,800,000."

The above is made I find from the Philosophical Magazine of that year. Since that period it appears in evidence before the Committee of the House of Commons, on Gaols and Transportation, (to which I refer your readers,) that about ten years ago Mr. M'Arthur carried over with him to New South Wales some Spanish sheep he purchased at the king's sale; from these *pure* ewes have sprung his present *pure* bred flock and *pure* rams, which produced the wool of lot 19. The highest crosses produced the lot 18, and the various other crosses as I have enumerated.—The carcase of these crossed wethers weigh on an average 50lbs. each, and the average weight of the fleece is from 2½ to 3 lbs.

The superior climate of New South Wales appears to have operated powerfully in aid of the great attention and care bestowed by Mr. M'Arthur on his flocks.

From the minute referred to above, it appears he has about 7000 sheep of various crosses; and the Merino blood has been spread more or less nearly all through the colony; so that there can be but little doubt of the increase of that breed in the colony, under proper attention and care.

COLUMELLA MINOR.

Tuesday se'nnight a young man was backed for twenty guineas to go sixteen miles in two hours, on a two mile piece marked out on the Bristol road, near Gloucester, England, which he accomplished two minutes and a half within the given time. In consequence of a fall of thick small rain the road became so greasy for the last hour that he ran in his stockings without shoes.

RECIPES.

Rheumatism.—It is said to be a specific for the Rheumatism to apply a cabbage leaf to the part affected —Choose a perfect leaf, cut off the protruberant stalk at the back, and place it on the part with a bandage of flannel, at going to bed. It will produce a local perspiration, and in two or three repetitions, effect a cure.

Cholera Morbus.—One quarter of a pound of fresh mutton suet, cleared of the fibres, &c. to a quart of new milk, which must be boiled, or rather simmered down to a pint; a table spoonful taken at a time, will cure the most inveterate summer complaint, particuly in children.

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